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5    **TITLE:**                    **SELF CONTAINED VACUUM BOOM**

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## BACKGROUND of the INVENTION

### FIELD of the INVENTION

A self-contained powered mobile articulating vacuum boom conduit having the ability to rotate 360 degrees. Said boom may be attached to or removed from a vacuum container. Said boom assembly may also contain means to provide a float shut off valve to the inlet of a vacuum source.

The vacuum boom arm may be telescoped in or out, extended or retracted, raised or lowered, lengthened or shortened or rotated in any of 360 degrees or rotated in multiple 360 degrees rotations. Rotation is not limited by power supply sources.

A linear actuators powered by a battery mounted on the boom is an example of means to articulate the boom arm.

A battery-operated motor is an example of means to rotate the boom using a gear or belt with pulley. A solar panel may be used to recharge the battery.

A vacuum driven air motor using the source of vacuum within the attached vacuum container is another example of means to articulate or rotate the self-contained boom assembly.

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5 Description of the PRIOR ART

Current state of the art vacuum boom arms are powered by a remote hydraulic power source.

The primary objective of the present invention is to provide a self contained powered boom which is powered by a battery which is also  
10 mounted on the boom. The battery powers a linear actuator which in turn articulates the boom and extends or retracts a telescoping portion of the boom. A solar battery charger may be mounted on the boom or a charger cord may be run to the battery to charge it either between uses or during use of the boom.

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### BRIEF DESCRIPTION of the DRAWINGS

10        FIG. 1 is a cross section side view of a self-contained vacuum boom hose  
assemble mounted on to a vacuum container 1. The self-contained boom assembly  
consists of an extendable conduit or Hose 3, which may be lengthened, shortened, raised  
or lowered by a linear actuator 4. Flexible sections of vacuum conduit 9 may be used as  
needed to connect moveable, ridged conduit sections. Debris 2 is vacuumed into the  
15        vacuum container 1 through the vacuum conduit Hose 3. The Boom Assembly rotates on  
a lubricant seal 17. A Drive Motor 6 attached to the Boom Assembly upper section  
drives a gear meshed to a turret gear foundation 5, thus allowing the Boom Assembly to  
rotate to any of 360 degrees or in multiple 360 degrees rotations. Battery Box 7 is a  
location on the Boom Assembly to mount and store batteries. A solar panel 8 may be  
20        used to recharge the battery power source. A vacuum source Ball Float Valve 11 is also  
shown.

FIG. 2 is a close up view of the Boom Assembly foundation and attachment  
means.

25        A Vacuum Container Access Collar 19 serves as the foundation for mounting the  
Boom Assembly to. The Access Collar 19 may be an existing man-way to a Vacuum

- 5 Container or an Access Collar attached to the Vacuum Container for the purpose of mounting the Boom Assembly.

A Seal 15 is shown attached to the Access Collar 19, which seals against the Turrent 5. A Lubricant Seal 17 such as UHMW Polyethylene is shown between the turret 5 and the rotating Boom Turn Table 16.

- 10 A Stabilizer 13 is shown to reduce unwanted movement during rotation and articulating boom.

A Boom Hose Discharge Conduit 12 is shown extending into the Vacuum Container.

- A Boom Attachment Fastener Means 14 is shown attaching the Boom Assembly  
15 to the Collar 19 of the Vacuum Container 1.

FIG. 3 further displays a means to make the Float Valve 11 a part of the self-contained Boom Assembly. The Float Valve 11 is shown attached to the Vacuum Source Conduit 10.

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- FIG. 4 is similar to FIG. 1 except that the linear actuator shown to extended or retract the vacuum hose, also supports the vacuum hose. In prior art designs a hydraulic cylinder extends or retracts a telescoping load support arm which holds the weight of both the vacuum conduit and the hydraulic cylinder. As shown in FIG. 4 the linear actuator serves  
25 both to hold the weight of the vacuum hose and extend or retract the horizontal reach of the vacuum hose.

## SUMMARY of the INVENTION

The above described objectives and others are met by a self-contained powered mobile articulating vacuum boom conduit having the ability to rotate 360 degrees. Said boom may be attached to or removed from a vacuum container. Said boom assembly  
10 may also contain means to provide a float shut off valve to the inlet of a vacuum source.

The vacuum boom arm may be telescoped in or out, extended or retracted, raised or lowered, lengthened or shortened or rotated in any of 360 degrees or rotated in multiple 360 degrees rotations. Rotation is not limited by power supply sources.

15 A linear actuators powered by a battery mounted on the boom is an example of means to articulate the boom arm.

A battery-operated motor is an example of means to rotate the boom using a gear or belt with pulley. A solar panel may be used to recharge the battery.

A vacuum driven air motor using the source of vacuum within the attached  
20 vacuum container is another example of means to articulate or rotate the self-contained boom assembly.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The above described needs are met by a self contained vacuum boom arrangement as shown in FIG. 1 as a cross section side view of a self-contained vacuum boom hose assemble mounted on to a vacuum container 1. The self-contained boom assembly consists of an extendable conduit or Hose 3, which may be lengthened, shortened, raised or lowered by a linear actuator 4. Flexible sections of vacuum conduit 9 may be used as needed to connect moveable, ridged conduit sections. Debris 2 is vacuumed into the vacuum container 1 through the vacuum conduit Hose 3. The Boom Assembly rotates on a lubricant seal 17. A Drive Motor 6 attached to the Boom Assembly upper section drives a gear meshed to a turret gear foundation 5, thus allowing the Boom Assembly to rotate to any of 360 degrees or in multiple 360 degrees rotations. Battery Box 7 is a location on the Boom Assembly to mount and store batteries. A solar panel 8 may be used to recharge the battery power source. A vacuum source Ball Float Valve 11 is also shown. And in FIG. 2 as a close up view of the Boom Assembly foundation and attachment means.

A Vacuum Container Access Collar 19 serves as the foundation for mounting the Boom Assembly to. The Access Collar 19 may be an existing man-way to a Vacuum Container or an Access Collar attached to the Vacuum Container for the purpose of mounting the Boom Assembly. A Seal 15 is shown attached to the Access Collar 19, which seals against the Turrent 5. A Lubricant Seal 17 such as UHMW Polyethylene is shown between the turret 5 and the rotating Boom Turn Table 16.



5           A Stabilizer 13 is shown to reduce unwanted movement during rotation and articulating boom.

          A Boom Hose Discharge Conduit 12 is shown extending into the Vacuum Container.

          A Boom Attachment Fastener Means 14 is shown attaching the Boom Assembly  
10   to the Collar 19 of the Vacuum Container 1.

          FIG. 3 further displays a means to make the Float Valve 11 a part of the self-contained Boom Assembly. The Float Valve 11 is shown attached to the Vacuum Source Conduit 10.

15   FIG. 4 shows a similar boom to FIG. 1 except that the linear actuator shown to extended or retract the vacuum hose, also supports the vacuum hose. In prior art designs a hydraulic cylinder extends or retracts a telescoping load support arm which holds the weight of both the vacuum conduit and the hydraulic cylinder. As shown in FIG. 4 the linear actuator serves both to hold the weight of the vacuum hose and extend or retract  
20   the horizontal reach of the vacuum hose.

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